



**CONSTRUCTION DOCUMENT
100% SUBMISSION**

Lebanon VA Medical Center
Replace Oil Switch

Contract #: VA-244-P-1813
Project #: 595-11-134

Prepared by:
AE Works, Ltd.
101 W. Station Square Dr.
Gatehouse Suite 401
Pittsburgh, PA 15219
V: 412-287-7333
F: 412-499-3143

Date: May 2, 2012

Project: Lebanon VA Oil Switch Replacement

Title: Construction Documents – 100% Submission

Attachments: Schematic Illustrations

The purposes of this narrative is to illustrate the design intent associated with the removal of the existing oil switch distribution equipment and subsequent installation of new gas switches and transformers within the existing campus distribution system at the Lebanon VA Campus.

Basis of Design Narrative

- A. The Design Narrative is based on the following existing conditions, current construction, and proposed construction projects:
1. Existing single line diagram for the primary electrical system as noted on As Built Drawings dated Oct. 19, 1995 with Revision 6, Dated 6/23/10.
 2. Electrical construction documents for the Expand Endoscopy/Emergency Dept. project.
 - a. Contract #: VA-244-10-RP-033
 - b. Project #: 595-CSI-002
 3. Electrical construction documents for the Expand Surgery Services project.
 - a. Contract #: VA-244-10-RP-0358
 - b. Project #: 595-390

Existing Conditions of Primary Electrical System

- A. Existing conditions are based on the single line noted previously within Basis of Design Narrative and the inclusion of all work anticipated to be completed within the construction documents noted previously within Base of Design Narrative.
- B. Existing 15kV Switching System
1. The existing 15 kV switching system is located within Building #123, which is positioned in the northeast portion of the site.
 2. MET-ED Utility Company provides two separate 13.2 kV feeders to the switching station. The preferred feeder provides power to Main Breaker #1 and the alternate feeder provides power to Main Breaker #2.

3. The campus does not have a redundant campus “loop” distribution system.
4. The Switching Station North Grid Feeder Breaker currently provides power to the following:
 - a) S6 – Oil Switch – 400 Amp, 5-way
 - b) S19 – Oil Switch – 400 Amp, 5-way
 - c) S18 – Oil Switch – 400 Amp, 5-way
(Note: S18 includes a “normally open” switch which disconnects the North Grid from the South Grid. It can be manually closed to provide power to additional switches.)
5. The Switching Station South Grid Feeder Breaker currently provides power to the following:
 - a) S100 – Oil Switch – 400 Amp, 3-way
 - b) S1 – Gas Switch – 630 Amp, 6-way
 - 1) This gas switch being installed under the Expand Endoscopy/Emergency Dept. Project.
 - c) S3 – Gas Switch – 630 Amp, 4-way
 - 1) This gas switch is served from S1 and is not currently being fed directly from the South Grid of the Campus Distribution System.
 - d) S102 – Gas Switch – 630 Amp, 4-way
 - e) S2 – Gas Switch – 630 Amp, 5-way
 - f) S136 – Gas Switch – 630 Amp, 5-way

C. Existing Feeder Distribution System

1. The existing campus distribution system is fed via underground duct banks.
2. Each duct bank currently includes a 4” conduit which contains feeder wire and a 4” conduit serving as a spare. The contractor shall pull new feeder wire through existing spare and connect to new equipment. The contractor shall pull the existing feeder wire from duct bank, leaving duct as spare. The contractor shall install pull string with ‘new’ spare conduit within ductbank.
3. The 15kV rated feeder wire is sized at #4/0 AWG, and includes a #4/0 AWG ground wire. This feeder wire is rated at 315 Amps within the underground duct bank classification.

D. Existing Loads

1. Existing actual load noted during site visit, October 13, 2011, for the switching station was as follows:
 - a) North Grid: 30A @ 13.3kV
 - b) South Grid: 52A @ 13.3kV
 - c) Total Load: 82A @ 13.3kV
 - d) Note: Load measurements do not include the loads of Building 10.

Scope of Work:

- A. Overcurrent Protection Devices at Switching Station
 - 1. Existing to Remain.
 - a) The existing equipment within Building 123 shall remain.
- B. Ductbanks, Conduits, and Conductors
 - 1. Existing campus loop distribution ductbanks shall remain.
 - 2. Additional ductbanks, conduits, and conductors shall be provided to complete electrical connections to new equipment and existing distribution lines.
- C. Oil/Gas Switches
 - 1. Existing Gas Switches sized at 630A, with greater than 4-way capability shall be existing to remain.
 - 2. Existing Oil Switches shall be disconnected and removed. New 630A, 6-way Gas Switches shall be installed.
 - 3. Existing Gas Switches sized less than 630A, shall be disconnected and removed. New 630A, 6-way Gas Switches shall be installed.
- D. Metering
 - 1. Remote monitoring of the site electrical distribution system shall be provided through self-contained, equipment mounted, Eaton metering equipment.
 - 2. Monitoring points shall be on the secondary side of new and existing pad mounted transformers. Equipment may be located at transformer or internal to existing buildings as conditions permit.
 - 3. New metering system shall be coordinated with existing generator control system.
- E. Connections
 - 1. New Gas Switches shall be provided with new concrete pads, as required.
 - 2. Gas Switches shall be provided with large sweep PVC coated galvanized rigid steel 90 degree elbow conduits from each switch position to its associated manhole.
 - 3. Utilized switches shall be connected to existing ductbanks to complete pathways for electrical connections.
 - 4. Spare switch conduits shall be capped for future use.
- F. Landscaping
 - 1. Existing landscaping shall be removed from around existing electrical equipment.
 - 2. Landscaping shall be provided around all existing and new areas and shall be landscaped to match existing site/landscape plan.
 - 3. Landscaping fabric and #2 Stone shall be installed around gas switches and transformers up to new landscaping.

4. Grass shall be provided around new pads and to extents of excavation to match existing surrounding area.

Design Considerations:

1. Utilize existing manholes to greatest extent possible based on existing condition and location. Existing manholes shall be surveyed, with existing conditions to be verified. New manholes shall be installed as required.
2. Provide ease of accessibility to new and existing equipment as possible to ensure preventative and corrective maintenance is accomplished with minimal effort.
3. Utilize existing ductbank runs for pathways to new and existing equipment.
4. Coordinating new equipment layouts with existing equipment to be disconnected and removed. Current feeder wire routing does not utilize splices to complete distribution system. Splicing of feeder circuits is prohibited.
5. Provide Method of Procedure (MOP) for phasing of equipment installation and required cutovers.
6. Hazardous waste removal shall be the responsibility of the contractor. Contractor shall provide report to the owner detailing all hazardous waste and removal means.
7. Provide transformers which have impedance values which match existing transformers to ensure short circuit values match existing.
8. HVAC shall be maintained to facilities at all times by contractor. Temporary HVAC to be provided.

Attached Schematic Illustrations:

1. DD01 – Proposed Example of Deadfront Padmounted Gas Switch.
2. 630A Deadbreak Bolted Tee Connector.
3. Limited Source Justification



SPECIFICATIONS LIST

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SHOP DRAWING LOG

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SHOP DRAWING LOG

Project: Lebanon VA Medical Center - Replace Oil Switch
Project No.: 2011021

Date Rec'd	Spec Section # Shop Dwg # Sample #	Description	Discipline	REFERRED			RETURNED	
				To	Date Sent	Date Ret'd	To	Date
	01 00 00	General Requirements	Electrical					
	01 01 00	VA Provided Spec Section	Electrical					
	01 01 10	VA Provided Spec Section	Electrical					
	01 74 19	Construction Waste Management	Electrical					
	02 41 00	Demolition	Electrical					
	03 30 00	Cast-in-Place Concrete	Electrical					
	26 05 11	Requirements for Electrical Installations	Electrical					
	26 05 13	Medium Voltage Cables	Electrical					
		Terminations	Electrical					
		Fireproofing Tape	Electrical					
	26 05 21	Low Voltage Conductors	Electrical					
		Control Wiring	Electrical					
		Wire Lubricating Compound	Electrical					
		Cable Identification	Electrical					
	26 05 26	Grounding and Bonding Conductors	Electrical					
		Ground Rods	Electrical					
		Ground Connections	Electrical					
		Ground Terminal Blocks	Electrical					
		Corrosion Inhibitor	Electrical					
	26 05 33	Conduit Fittings	Electrical					
	26 05 41	Underground Electrical Construction	Electrical					
	26 05 71	Electrical Systems Protective Device Study	Electrical					
	26 12 19	Pad Mounted Liquid-filled, Medium voltage Transformers	Electrical					
		Cable Fault Indicators	Electrical					
		Medium Voltage Terminations	Electrical					
	26 18 41	Gas Switches	Electrical					
	27 05 11	Requirements for Communications Installations	Electrical					
	31 08 00	Commissioning of Site Utility Systems	Electrical					
	31 20 00	Earth Moving	Electrical					
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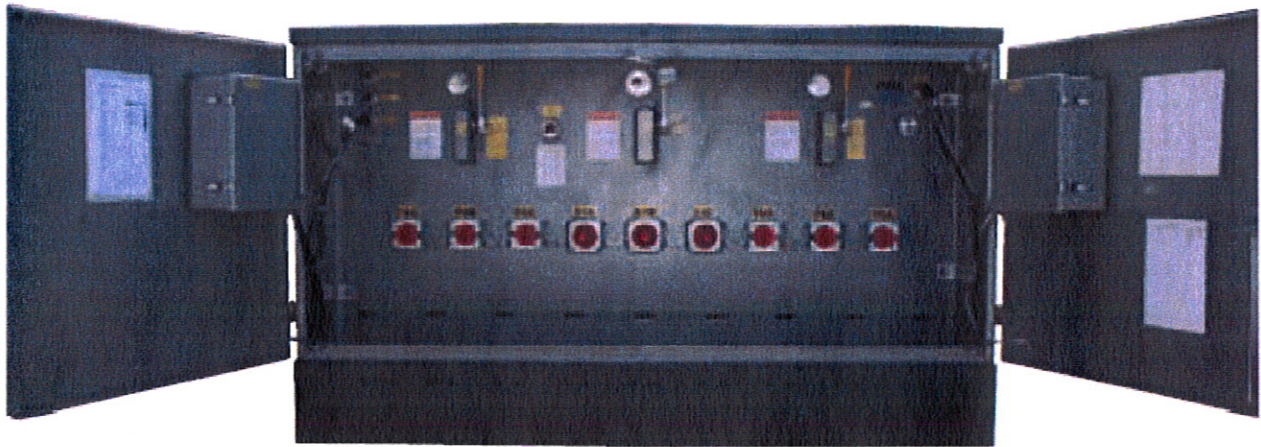
ILLUSTRATIONS

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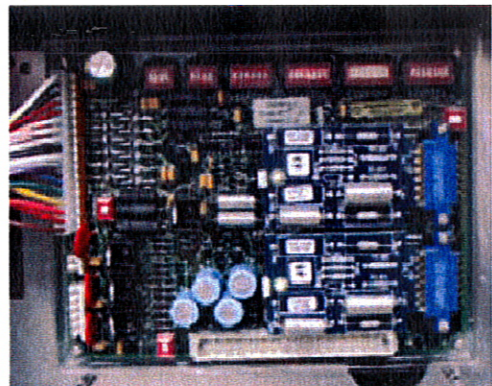
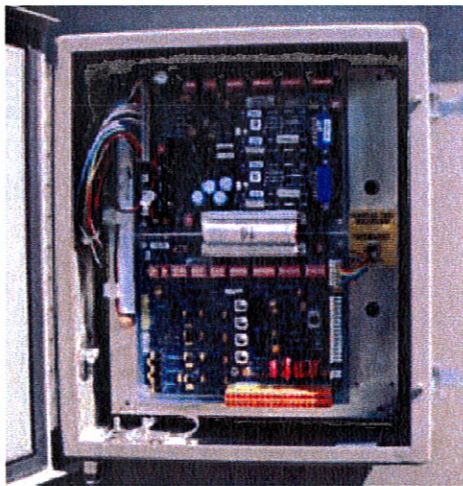
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ELEVATION PLAN – EXAMPLE GAS SWITCH



CONTROLS AND MODULES

 <small>www.ae-works.com 101 w. station square drive fourth floor pittsburgh, pennsylvania, 15219 T 412.287.7333 F 412.237.7334</small>		PROJECT:	OIL SWITCH REPLACEMENT	PROJECT NO. 2011021	ISSUE DATE:
		OWNER:	DEPARTMENT OF VETERANS AFFAIRS	DRAWN BY:	PROPOSED EXAMPLE OF DEAD-FRONT PAD MOUNTED GAS SWITCH
				CHECKED BY:	DD01
				SCALE:	

630 A Deadbreak Bolted Tee Connector

COOPER

Cooper Power Systems

DT400 - 24 kV Applications
DT436 - 36 kV Applications

"CA-1-T1"

Electrical Apparatus

1550-30

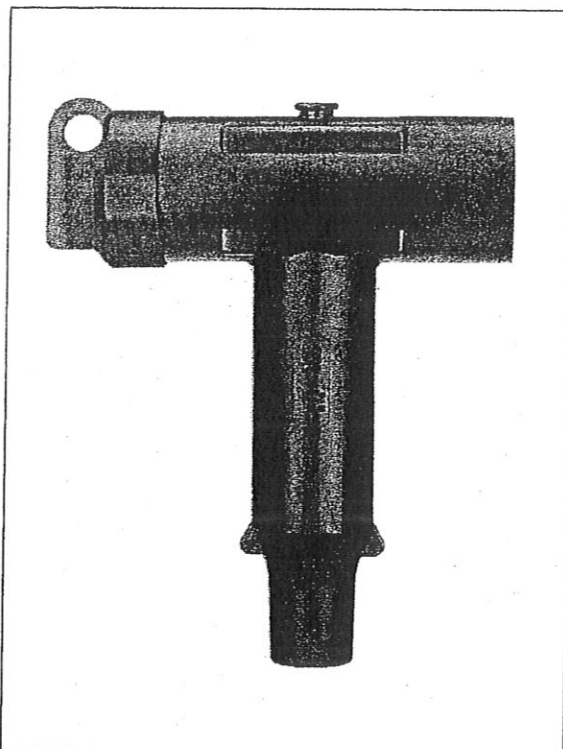


Figure 1.
630 A Deadbreak Bolted Tee Connector.

RELATED PRODUCTS

- DPC400 Connecting Plug
- DRC400 Receptacle Cap
- DPR400 Reducing Tap Plug
- DPS400 Standoff Plug
- DPE400 Earthing Plug

INSTALLATION

- No special tools, heating, taping, or potting are required.
- Connector may be energised immediately after installation on its mating part.
- Mates with bushings, plugs, and junction devices complying with the listed standards.

APPLICATION

- For connection of polymeric cable to transformers, switchgear, motors and other equipment with a premoulded separable connector.
- For indoor and outdoor installations.
- System voltage up to 36 kV.
- Continuous current 630 A (900 A overload for 8 hours).
- Cable particulars:
 - Polymeric cable (XLPE, EPR, etc.)
 - Copper or aluminum conductors
 - Semiconducting or metallic screens
- Conductor size: 12 kV 70-400 mm²
24 kV 25-400 mm²
36 kV 25-240 mm²
- An optional adapter kit is available for use with PILC cables.

FEATURES

- Provides a fully screened and fully submersible separable connection when mated with the proper bushing or plug.
- Built-in capacitive test point allows for an easy check of the circuit status or installation of a fault indicator.
- No minimum phase clearance requirements.
- Mounting can be vertical, horizontal, or any angle in between.
- 100% factory tested.

STANDARDS

- Will meet the requirements of VDE 0278, IEC 502-4, EDF HN 52-5-61, BS 7215 and others.

QUALITY ASSURANCE

- Our manufacturing facility is registered to ISO 9001-1994 by third party audit.
- Required Production Tests
- Periodic X-Ray Analysis

PACKAGING

- Supplied in a kit with all necessary parts, approximate weight 3 kg.

TABLE A
Electrical Ratings

	DT400	DT436
Maximum System Voltage (U _m)	24 kV	36 kV
Impulse	125 kV	170 kV
AC Withstand (5 min.)	54 kV	81 kV
Continuous Current	630 A	630 A
Overload (8 hrs Max.)	900 A	900 A
Short Circuit Withstand, 1 sec. (rms sym.)	35 kA	35 kA

Note: Ratings are based on IEC Standards and do not reflect maximum capability.

Features and Detailed Description

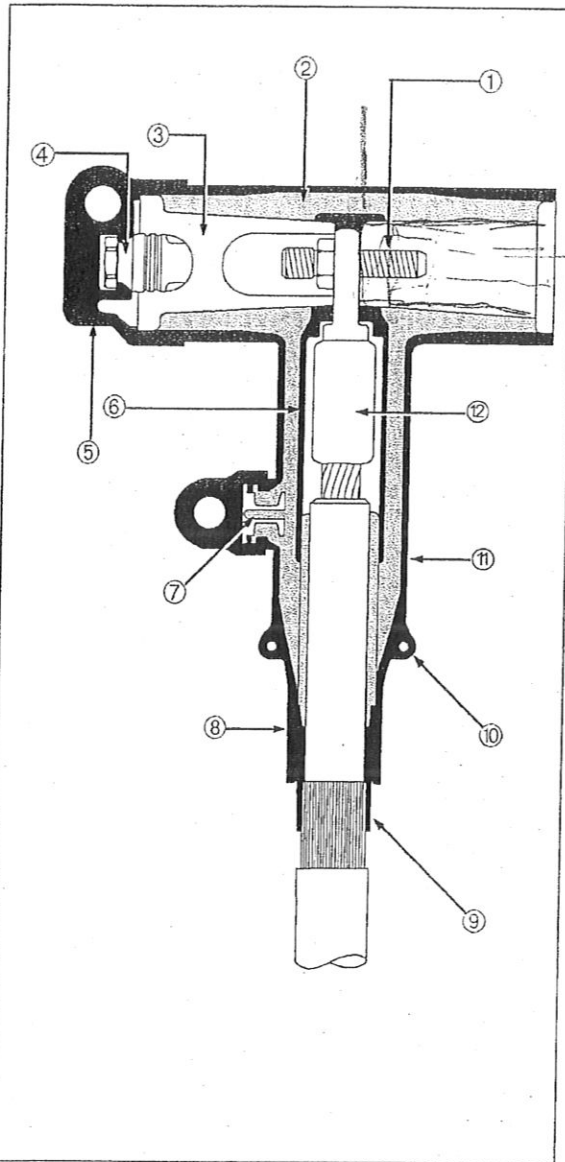


Figure 2.
630 A, 36 kV Class DT400 Deadbreak Tee Connector.

1. Clamping Screw

Tin-plated copper screw secures the conductor contact to the bushing.

2. Insulation

Moulded EPDM insulating rubber is formulated and mixed in-house to ensure high quality.

3. Basic Insulating Plug

Moulded epoxy part has a threaded metal insert to accept the clamping screw.

4. Capacitive Test Point

Capacitive test point provides means to check circuit status.

5. Rubber Cap

Moulded EPDM conducting rubber cap protects and earths the test point during normal operation.

6. Internal Screen

Moulded EPDM conducting rubber screen controls electrical stress.

7. Capacitive Test Point (Optional)

Provides a means to mount a fault indicator. A moulded EPDM conducting rubber cap provides a watertight seal.

8. Stress Relief

The configuration of the outer screen and the cable adapter provide cable stress relief.

9. Cable Adapter

The sized opening provides an interference fit to maintain a watertight seal and provides the initial cable stress relief.

10. Earthing Eyes

Moulded into the external screen for connection of an earthing wire.

11. External Screen

Moulded EPDM conducting rubber mates with the cable screen to maintain screen continuity and ensure that the assembly is at earth potential.

12. Conductor Contact

Inertia welded bimetallic compression connector accepts copper or aluminum conductors.

KERITE #410 SPS OD = 1.29" = 32.76 mm
VC

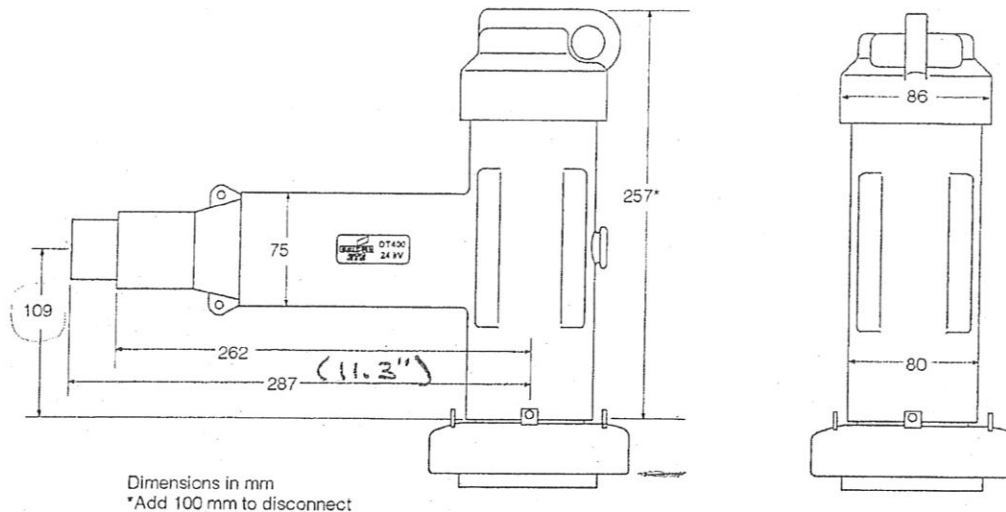


Figure 3.
DT400 Deadbreak Tee Connector dimensional information.

ORDERING INFORMATION

For 12 kV and 24 kV applications, the ordering formula is **DT400-R-C**. For 36 kV applications, the ordering formula is **DT436-R-C**. Substitute for R and C as described below. Select the range from Table R that best fits the diameter of the core insulation. Select the code from Table C for the conductor size and type of connector required.

TABLE R
Cable Insulation Range

Insulation Range Designation	Cable Insulation Range Ø (mm)	
	Min.	Max.
A	16.3	19.3
B	18.3	21.0
C	20.0	24.1
D	23.1	27.0
E	24.9	28.9
F	27.7	32.6
G	30.9	36.2
H	34.0	39.5

Optional Test Point

If a test point on the tee body is required, add a "T" before the insulation range designation.
Example: DT400TF240

Ordering Example: For 20 kV cable, 240 mm² aluminum conductor, 31.0 mm core insulation diameter, DIN connector, specify **DT400-F-240**.

NOTE: Bimetallic connectors can be used with aluminum or copper conductors.

Cable seal adapters are ordered separately.

TABLE C
Conductor Code

Stranded Conductor Size (mm ²)	DIN Type	EDF Type	DIN All Copper
25	25	E25	C25
35	35	E35	C35
50	50	E50	C50
70	70	E70	C70
95	95	E95	C95
120	120	E120	C120
150	150	E150	C150
185	185	E185	C185
240	240	E240	C240
300	300	-	C300
400	400	-	C400

COOPER

Cooper Power Systems

Quality from
Cooper Industries

P.O. Box 1640, Waukesha, WI 53187

Limited Source Justification
Use of Brand Name Specifications

REFERENCE: FAR 11.105, FAR 6.304, and VAAR 806.304

1. Identification of the Agency and Contracting Activity

Department of Veterans Affairs
Lebanon VA Medical Center
1700 S. Lincoln Ave.
Lebanon, PA 17042

2. Description of the Action

Contractor shall furnish management, supervision, labor, transportation, equipment, materials, and perform work to include general construction, alterations, electrical work, and certain other items as required by project drawings and specifications for Replace Oil Switch, Project No. 595-11-134.

This acquisition is a firm-fixed price construction buy.

3. Description of the Supplies/Services

- a. Gas Switches — G & W SPRAM66-376F-40PI — see Specification Section 26 18 41: The furnishing, installation, and connection of G&W, 630A, 6-way, pad mounted insulated gas switches including enclosure, load break switches, and all controls.
- b. Transformers — ABB — see Specification Section 26 12 19: The furnishing, installation, and connection of ABB Three Phase pad mounted transformers.
- c. Metering — Square-D — see Specification Section 26 12 19: The furnishing, installation, and connection of Square-D metering, including all programming, controls, installation labor, commissioning, start-up, and training.

4. Justification Rationale for Use of Brand Name Specifications

- a. Gas Switches — G & W SPRAM66-376F-40PI — see Specification Section 26 18 41: Restriction of sources for this acquisition is justified in accordance with FAR 8.405-6(b)(3), the item is peculiar to one manufacturer. Although there are other manufacturers of gas switches, the equipment is not consistent with the system currently in place throughout the medical center. The G&W switches will be the exclusive manufacturer of gas switches and is in the VA's best interest to maintain consistency of the electrical distribution system. Use of other manufacturers would lead to storing additional inventory, functioning issues due to non-compatibility with existing maintenance equipment, multiplicity of service contracts, and increased training and operator requirements.
- b. Transformers — ABB — see Specification Section 26 12 19: Restriction of sources for this acquisition is justified in accordance with FAR 8.405-6(b)(3), the item is peculiar to one manufacturer. Although there are other manufacturers of pad mounted transformers, that equipment is not compatible with the system currently in place throughout the medical center. The ABB transformers and Bio temp fluid inherent to the transformer are exclusively used at this facility and it is in the VA's best interest to maintain consistency of the electrical distribution system. Use of other manufacturers would lead to storing additional inventory, functioning issues due to non compatibility with existing equipment, multiplicity of service contracts, and increased training and operator requirements.
- c. Metering — Square-D — see Specification Section 26 12 19: Restriction of sources for this acquisition is justified in accordance with FAR8.405- 6(b)(3). Although there are other manufacturers of metering, those meters are not compatible with the systems currently in place in the medical center. A Square-D metering system is currently being implemented at the facility.

5. Determination

Based on the information above, it is hereby determined that this written justification for a particular brand names, is essential to the Government's requirements, and market research indicates other companies' similar products, or products lacking the particular feature, do not meet, or cannot be modified to meet the agency's needs. Therefore, these products will be specified as a brand name for this construction project as only these products meet the Government's needs.

6. Certification, Review, and Approval

Technical/Requirements Personnel Certification:

I certify that the facts and representations under my cognizance which are included in this justification are complete and accurate.

Name and Title	Signature	Date
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Contracting Officer Certification:

I certify that this justification is accurate and complete to the best of my knowledge and belief.

Name and Title	Signature	Date
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Approval of the Justification — Agency Competition Advocate

Name and Title	Signature	Date
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